

**Rockwell
Collins**

HDG 090

GS 60

HOLD TAXI

Surface Guidance System

*An Integrated Solution for
Surface Operations*

Rev 1

Flight Dynamics **October 2000**

NASA Technology Transfer

- Surface Guidance System is a real world example of NASA technology transfer
- Rockwell Collins - one of the top suppliers of electronic equipment for aircraft - is taking pioneering R&D work performed by NASA and applying it to real aircraft
- NASA studies explore feasibility and human factors to reduce development risk

**NASA studies provide concept credibility
supporting further industry investment**

NASA Studies and Demonstrations

- NASA simulation and field tests demonstrated the feasibility of using new technologies to improve Surface Operations:
 - Chicago Airport Taxi Simulation 1997
 - Atlanta Airport Flight/Taxi Test 1997
- Some of the technologies demonstrated were:
 - Electronic moving maps (EMM)
 - HUD displays
 - Databases
 - ADS-B
 - CPDLC
 - DGPS

Sources: Steve Young, Denise Jones, NASA Langley, Flight testing of an Airport Surface Guidance, Navigation and Control System, presented at ION conference January, 1998. McCann et al, AIAA and SAE, 1998 World Aviation Conference, Anaheim, CA, Sept. 28-30, 1998, AIAA Paper 98-5541; SAE Paper 985541

Using NASA's expertise

NASA has developed and demonstrated new operational concepts to improve Surface Operations

- **Enhanced situational awareness**
- **Greater pilot confidence**
- **Fewer taxi path blunders**
- **Increased taxi speeds**
- **Shorter taxi planning time**
- **Fewer stops**

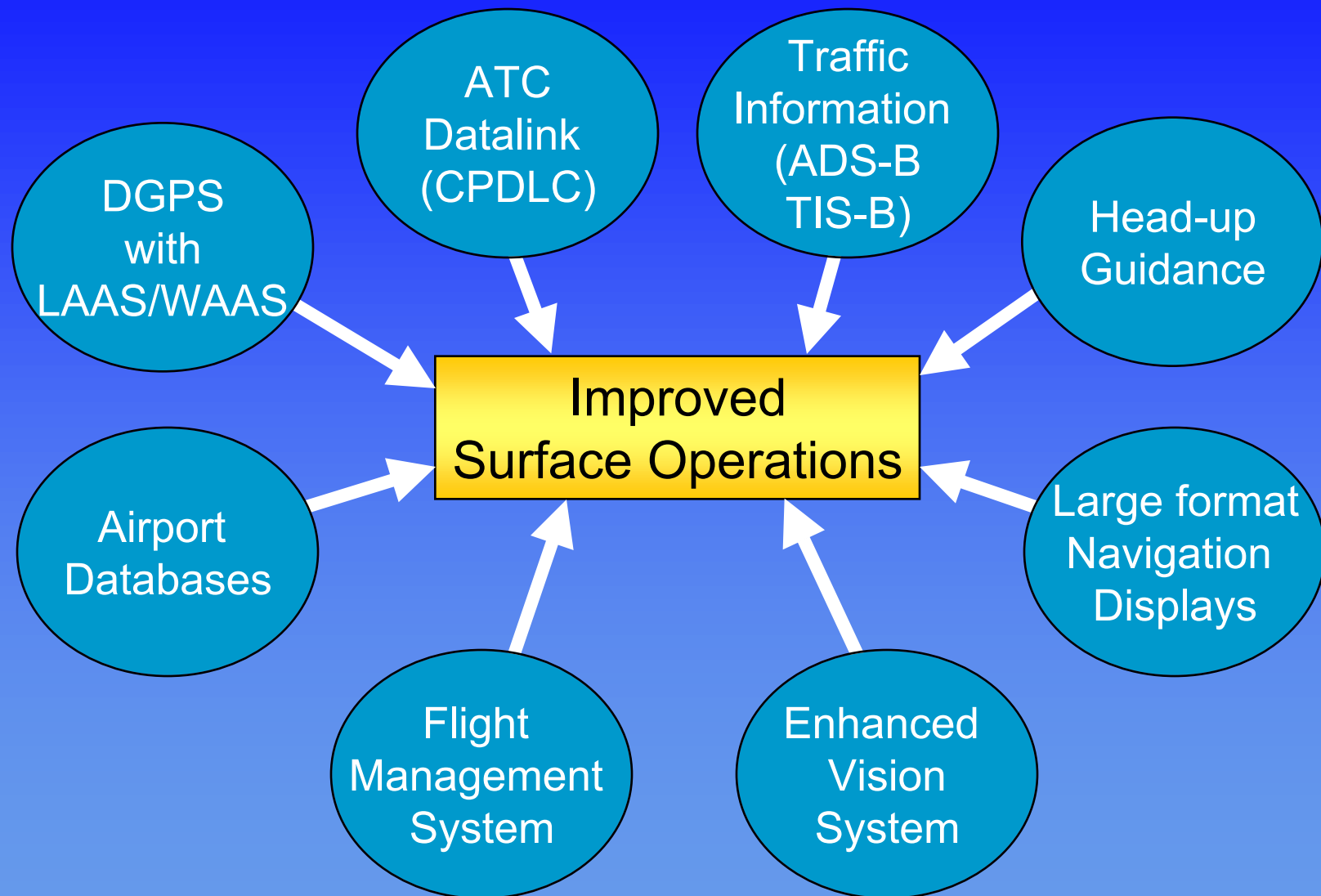
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From NASA to Production

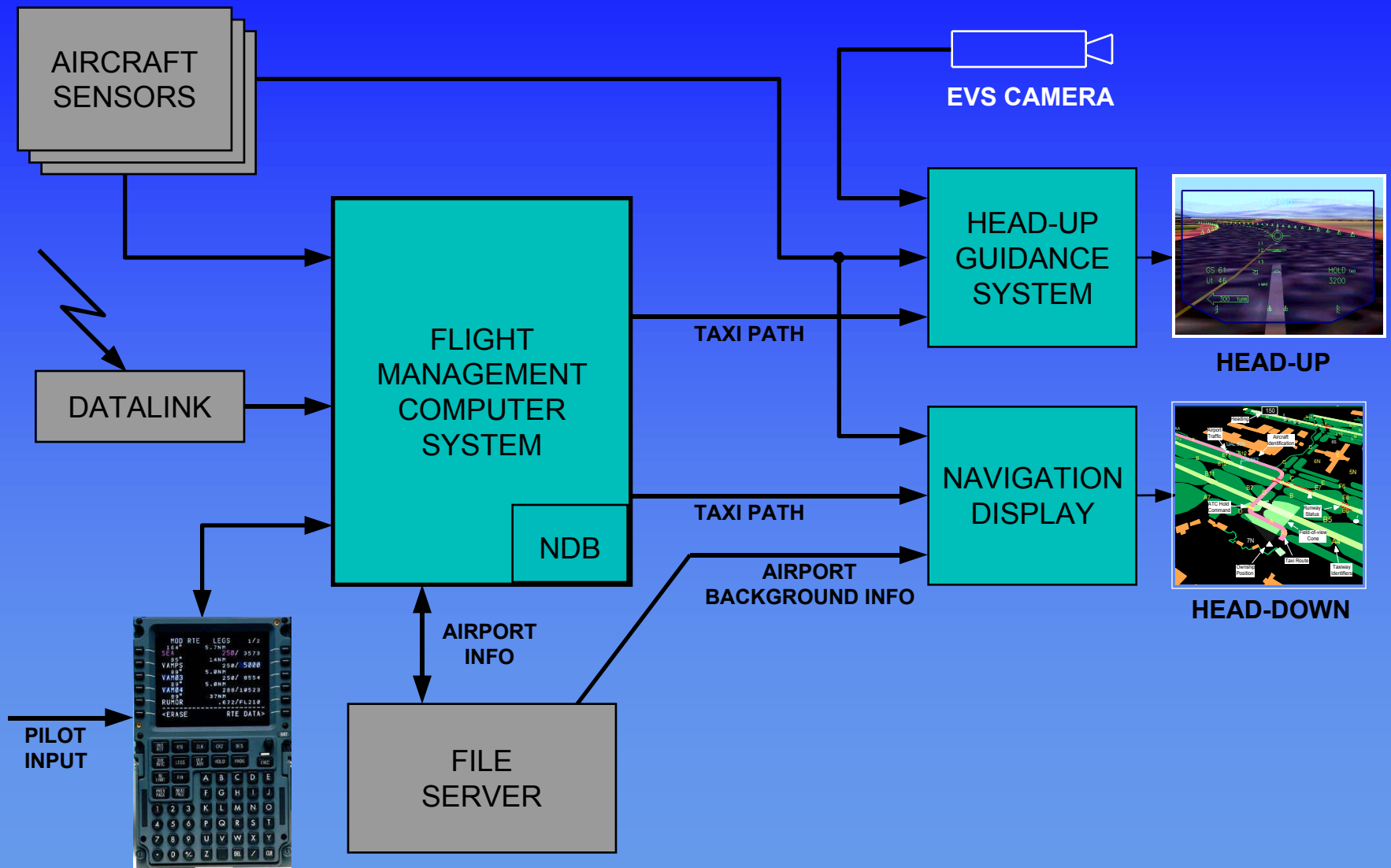
The SGS team is developing a product for sale to aircraft operators that will significantly improve safety

- **SGS functions will be allocated to existing aircraft equipment to reduce cost**
- **Certification basis will be developed with the help of the FAA**
- **Economic analysis will define potential benefits**
- **Customers will define which functions are developed first**
- **Production could start in 2002**

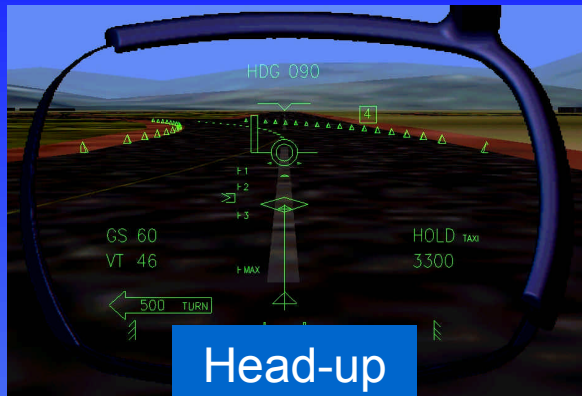
Enabling Technologies



SGS Integrated Solution



The SGS Integrated Solution

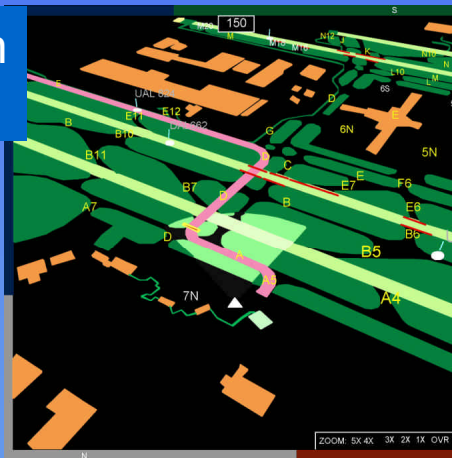


Head-up
Guidance

- Primary Display
- Tactical info
- Conformal with outside world
- EVS display

Navigation
Display

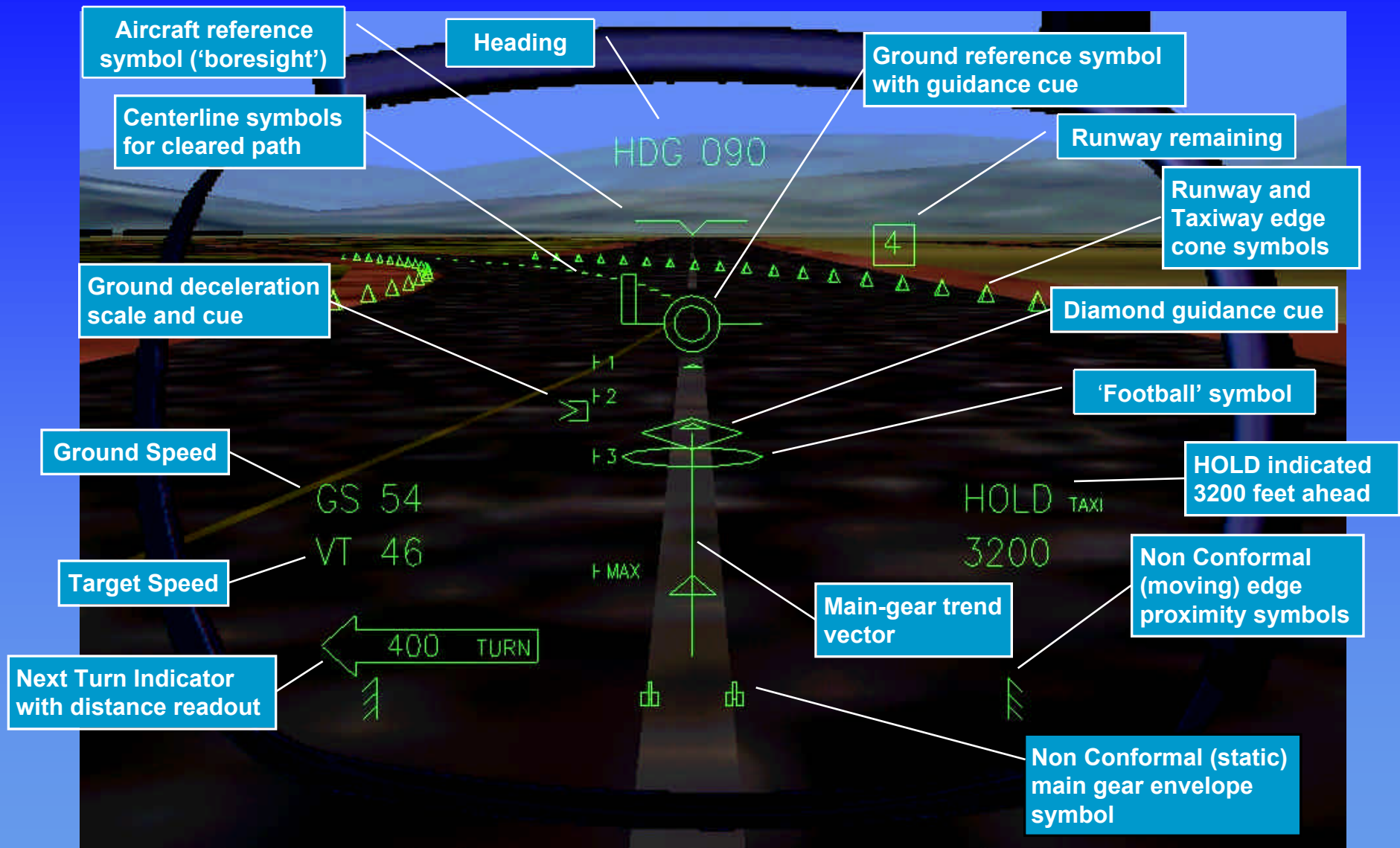
- Secondary Display
- Strategic and planning info
- View from above
- Alternative to chart



Flight
Management
System

- Pilot Interface
- Datalink terminal
- Database access
- Navigation

HGS Symbology Summary



The SGS Development Team

Currently developing demonstration system

- **Rockwell Collins**
 - **Flight Dynamics**
 - **Air Transport Systems**
 - **Business and Regional Systems**
- **NASA**
- **Smiths Industries Aerospace**
- **Jeppesen Sanderson Inc.**